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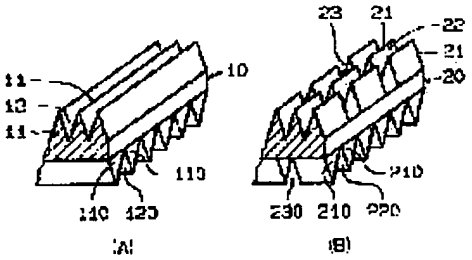
(54) INTERLAYER FOR LAMINATED GLASS

(57)Abstract:
PROBLEM TO BE SOLVED: To obtain an interlayer for laminated glass having excellent blocking resistance, handling at the time of sandwiching the interlayer between glass plates, and capability of being deaerated in a preliminary bonding process.
SOLUTION: This interlayer for laminated glass comprises a flexible thermoplastic sheet both surfaces of which are embossed with a number of parallel raised streaks in such arrangement that each raised streak 11 or 21 in one surface intersects a raised streak 110 or 210 in the other surface, and in a length set longer than the groove width of a recessed groove 12 or 220. In this interlayer, it is preferable that the surface roughness (RZ) of at least one of the embossed surfaces satisfies the condition of RZ2>0.8 RZ1≥RZ3 where RZ1 is surface roughness determined at 0-30° C, RZ2 is surface roughness determined at 0-30° C after the interlayer is kept at a temperature that is higher than 30° C and not above 60° C for 1-20min, and RZ3 is surface roughness of the embossed surfaces determined at 0-30° C after the interlayer is kept at a temperature that is higher than 60° C and not above 90° C for 1-20min. Furthermore it is preferable to form the emboss at 90-130° C.



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CLAIMS

[Claim(s)]
[Claim 1] It is the interlayer for glass laminates which is arranged by forming in both sides of a thermoplastics sheet embossing which consists of many parallel protruding lines so that each protruding line of one field and each protruding line of the field of another side may cross mutually, and is characterized by setting up the die length of each protruding line for a long time than the flute width of the concave to each protruding line.
[Claim 2] The surface roughness (Rz) of embossing of at least one side is Rz2 >0.8Rz1 >=Rz3. Interlayer for glass laminates according to claim 1 characterized by being satisfied. Here, it is Rz1. The surface roughness of embossing measured at the temperature of 0-30 degrees C is expressed. Rz2 The surface roughness of embossing measured at the temperature of 0-30 degrees C after exceeding 30 degrees C and leaving it for 1 - 20 minutes at the temperature of 60 degrees C or less is expressed, and it is Rz3. After exceeding 60 degrees C and leaving it for 1 - 20 minutes at the temperature of 90 degrees C or less, the surface roughness of embossing measured at the temperature of 0-30 degrees C is expressed.
[Claim 3] The interlayer for glass laminates according to claim 1 or 2 characterized by forming embossing at the temperature of 90-130 degrees C.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the interlayer for glass laminates in which embossing which consists of detailed irregularity was formed.
[0002]
[Description of the Prior Art] The glass laminate on which the interlayer which consists of thermoplastics sheets, such as a plasticization polyvinyl butyral, between glass plates was pasted up is widely used for windowpanes, such as an automobile, an aircraft, and a building.
[0003] It draws through through this on a press roll, or it puts into the rubber back, reduced pressure attraction is carried out [an interlayer is pinched between glass plates,], and this kind of glass laminate is manufactured by carrying out preparative pressure arrival, considering as a layered product, carrying out heating application of pressure of this deaerated layered product within an autoclave subsequently, and carrying out this sticking by pressure, deaerating the air which remains between a glass plate and an interlayer.
[0004] in case [when basic engine performance, such as an adhesive property, weatherability, penetration-proof, and transparency, is good] it is remarkably alike and lets out under storage and from a volume serious condition, that the handling workability at the time of pinching an interlayer between that interlayers do not block and a glass plate is good, and in order to lose the contamination of air further, it is required for such an interlayer for glass laminates that the deaeration nature like preparative pressure commencement of work should be good. Especially the deaeration nature like preparative pressure commencement of work influences the quality of a glass laminate, air bubbles are generated as deaeration is inadequate, and the transparency of a glass laminate worsens.
[0005] In order to fill such a demand, embossing which consists of detailed irregularity is usually formed in the both sides at the interlayer. Various kinds of concavo-convex patterns formed as a gestalt of this detailed irregularity in the crevice to the projection which a large number became independent of, and this projection, or various kinds of concavo-convex patterns which were formed by the concave to many a protruding line and this protruding line are indicated (for example, refer to JP,1-32776,B).
[0006]
[Problem(s) to be Solved by the Invention] However, although the blocking resistance of interlayers, handling workability, and the deaeration nature like preparative pressure commencement of work are fairly improved if it is in the above-mentioned conventional interlayer, there is still room of an improvement. That is, it is the irregular concavo-convex pattern which consisted of crest type (wave type) projections which a large number became independent of, and although blocking nature and handling workability are excellent in embossing formed in the level from which a height of thread and the depth of a trough differ irregularly, respectively, it is not enough satisfactory in respect of deaeration nature.
[0007] Moreover, by embossing to which a height of thread and the depth of a trough were regularly formed in the same level, respectively, or embossing which consists of many parallel protruding lines, although deaeration nature is excellent, interlayers are easy to be the regular

concavo-convex pattern which consisted of cones which a large number like a rectangular-head drill became independent of, and to block it, as proposed by the above-mentioned patent official report. Actually [it is rare for a crest or the top-most vertices of a protruding line to gather, and to contact accuracy, and / while], a crest or a protruding line enters into the trough or concave of another side, and this is guessed for contacting the slant surface part of a crest or a protruding line more often mutually, in case interlayers lap.
[0008] Furthermore, when manufacturing a glass laminate with a large area, and a glass laminate with large curvature, or especially when raising the productivity (especially line speed like preparative pressure commencement of work) of a glass laminate, the conventional interlayer is not enough satisfactory in respect of deaeration nature, and still has the room of an improvement.
[0009] This invention solves the above-mentioned problem, and the place made into that object is to provide the interlayer for glass laminates excellent in the deaeration nature like preparative pressure commencement of work while excelling in the handling workability at the time of pinching an interlayer between the blocking resistance at the time of letting out under storage and from a volume serious condition, or a glass plate.
[0010]
[Means for Solving the Problem] Embossing the above-mentioned object becomes [embossing] both sides of a thermoplastics sheet from many parallel protruding lines is formed, it is arranged so that each protruding line of one field and each protruding line of the field of another side may cross mutually, and the interlayer for glass set up for a long time than the flute width of the concave to each protruding line can attain the die length of each protruding line.
[0011] As a thermoplastics sheet used for this invention, the sheet used for the interlayer of the conventional glass laminate is used. For example, a plasticization polyvinyl-acetal resin sheet, a polyurethane system resin sheet, an ethylene-vinyl acetate system resin sheet, an ethylene-ethyl acrylate system resin sheet, a plasticization vinyl chloride system resin sheet, etc. are mentioned. Sheets, such as this, are excellent in the basic engine performance required of glass laminates, such as an adhesive property, weatherability, penetration-proof, and transparency.
[0012] The plasticization polyvinyl-acetal resin sheet especially represented with a plasticization polyvinyl-butyral-resin sheet is suitable in respect of the above-mentioned basic engine performance. The thickness of thermoplastics sheets, such as this, is decided in consideration of penetration-proof required as a glass laminate etc., and is comparable as the conventional interlayer, and it is desirable to be especially referred to as 0.2-2mm.
[0013] In this invention, although embossing which consists of many parallel protruding lines is formed in both sides of the above-mentioned thermoplastics sheet, it is arranged so that each protruding line of one field and each protruding line of the field of another side may cross mutually (a rectangular cross or scissor junction), and the die length of each protruding line needs to be set up for a long time than the flute width of the concave to each protruding line. The reason is as follows.
[0014] That is, it lets out an interlayer from a volume serious condition in the case of an activity, or it judges this to fixed die length, it is kept as a volume serious condition, lays this on top of a multilayer, is prepared, ejection pinches a required interlayer from such a volume serious condition or a layered product, and it pinches one of this at a time between glass plates one by one, and it is preparative pressure commencement of work, and it is usually deaerated.
[0015] In this case, if it is arranged like the interlayer of this invention so that each protruding line of one field and each protruding line of the field of another side may cross mutually, and the die length of each protruding line is set up for a long time than the flute width of the concave to each protruding line In case interlayers lap, each protruding line of one field and each protruding line of the field of another side surely contact at the top-most vertices (crest) of each protruding line mutually, and one protruding line enters into the concave of another side, and does not contact the slant surface part of a protruding line. Consequently, the path of the concave which the blocking resistance of interlayers improves certainly and is open for free passage to the edge of a sheet is smooth, and the air which intervenes between layers from slot space, such as this, is deaerated easily.

[0016] In order to form such special embossing, the embossing roll method, the calendering roll method, a profile extrusion method, etc. are adopted as usual. In order to obtain embossing which consists of an parallel protruding line of fixed a large number quantitatively especially, the embossing roll method is suitable.
[0017] the above -- generally in special embossing, the cross-section configuration of each protruding line is formed the shape of a crest (wavelike), the shape of a triangle in which the head sharpened, the shape of a triangle the head wore a little, the trapezoidal shape in which the head was square, roundish [wore the head a little], the shape of a rectangle in which the head was square, in the shape of [wore the head a little] a rectangle, etc. Moreover, generally the cross-section configuration of the concave to each protruding line is formed in the shape of the shape of the shape of a reverse crest (wavelike), and V, and U, corniform, etc.
[0018] And the concave to each above-mentioned protruding line and each protruding line may be tidily distributed over parallel regularly on the surface of [whole] a sheet, and may be irregularly distributed over parallel in disorder. Moreover, all the height of each projection may be height which is different even if it is the same height, and may be the depth which is different even if all the depth of the concave to this the projection of each is also the same depth. It is the same height, and all the concaves to each protruding line also have the desirable thing of the same depth, and the whole especially of each protruding line is 10-200 micrometers about each of height of a protruding line, and depth of a concave especially. It is still more desirable to set up.
[0019] Moreover, generally the flute width (upside flute width) of the concave to each protruding line is 10-1000 micrometers. It is set up and is 50-500 micrometers especially. It is desirable. Moreover, generally spacing of each concave is 10-2000 micrometers. It is set up and is 50-500 micrometers especially. It is desirable and is further 20-100 micrometers. It is desirable. In this way, the interlayer for glass laminates of this invention (invention of claim 1) is obtained.
[0020] Thus, although embossing which consists of many parallel protruding lines is formed in both sides, the interlayer of this invention Although each protruding line of one field and each protruding line of the field of another side make it indispensable requirements to be arranged so that it may cross mutually, and to set up the die length of each protruding line for a long time than the flute width of the concave to each protruding line especially -- at least one side -- desirable -- the surface roughness (Rz) of double-sided embossing -- Rz2 >0.8Rz1 >=Rz3 What is satisfied is suitable. The surface roughness (Rz) of this embossing is JIS. B The ten-point average of roughness height measured based on 0601 is meant.
[0021] Here, it is Rz1. It is because the environmental temperature in storage and handling of an interlayer usual in having expressed the surface roughness of embossing measured at the temperature of 0-30 degrees C, and having adopted such temperature is mainly a 0-30-degree C temperature requirement. This is the usual measurement temperature of the surface roughness (Rz) of embossing, and, as for this measurement temperature, it is desirable to adopt the temperature of 20 degrees C.
[0022] Moreover, Rz2 After exceeding 30 degrees C and leaving it for 1 - 20 minutes at the temperature of 60 degrees C or less, the surface roughness of embossing measured at the temperature (the above-mentioned usual measurement temperature) of 0-30 degrees C was expressed, and such heat treatment conditions were adopted because it was necessary to put an interlayer on such conditions in that phase of the first half, and to hardly crush embossing on this condition in the case of preparative pressure arrival. As for this heat treatment condition, it is desirable to adopt the conditions for 40 degree-Cx 10 minutes.
[0023] Furthermore, Rz3 After exceeding 60 degrees C and leaving it for 1 - 20 minutes at the temperature of 90 degrees C or less, The surface roughness of embossing measured at the temperature (the above-mentioned usual measurement temperature) of 0-30 degrees C was expressed, and such heat treatment conditions were adopted because it was necessary to put an interlayer on such conditions in that phase of the second half, and to almost crush embossing on this condition in the case of preparative pressure arrival. As for this heat treatment condition, it is desirable to adopt the conditions for 80 degree-Cx 10 minutes.
[0024] And as a result of examining variously the surface roughness (Rz) of embossing after

heat-treating on the above conditions, it is Rz2 >0.8Rz1 >=Rz3. When satisfied, while excelling in blocking nature or handling workability, it found out by experiment that the interlayer in which the deaeration nature like preparative pressure commencement of work was further excellent was obtained. And it becomes possible for the preparative pressure arrival in comparatively low temperature to become possible, especially to gather the line speed like preparative pressure commencement of work.
[0025] Although it is influenced by the class of elasticity thermoplastics sheet, a concavo-convex gestalt, a concavo-convex pattern, etc. in order to obtain the interlayer which has such specific surface roughness A plasticization polyvinyl-butyral-resin sheet is used. For example, by the embossing roll method In case embossing which consists of many parallel protruding lines is formed in both sides, it is desirable to mainly carry out heating maintenance of the sheet temperature just before being introduced into an embossing roll at 20-100 degrees C, and to form embossing which consists of detailed irregularity, and it is especially the best for 55-95 degrees C to carry out heating maintenance.
[0026] If deformation of embossing at the time of leaving it which left the sheet under the temperature of 30-60 degrees C when this sheet temperature was less than 20 degrees C is too large and this sheet temperature exceeds 100 degrees C conversely The deformation of embossing at the time of leaving a sheet under the temperature of 60-90 degrees C is too small, and even if the object of this invention is attained, it becomes difficult to consider as the interlayer in which the deaeration nature like preparative pressure commencement of work was further excellent. In addition, in the conventional method, sheet temperature just before being introduced into an embossing roll was held at temperature higher than 100 degrees C. In this way, the interlayer for glass laminates of this invention (invention of claim 2) is obtained.
[0027] Furthermore, as a result of examining many things, it found out that that in which embossing is formed at the temperature of 90-130 degrees C was suitable. Here, the temperature of the above-mentioned embossing formation means the sheet skin temperature immediately after passing an embossing roller, and such sheet skin temperature can be measured with a non-contact type temperature measurement plan.
[0028] That is, the interlayer of preparative pressure arrival is pinched between glass plates, it is carried out by the approach (the reduced pressure deaerating method) of putting into the approach (drawing through the deaerating method) or the rubber back who draws through through this on a press roll, and carrying out reduced pressure attraction, and, generally an interlayer is put on 60-90-degree C conditions in the phase in the second half of preparative pressure arrival. In addition, when it is high voltage comparatively and preparative pressure arrival is carried out by high temperature and short time amount, when drawing through and adopting the deaerating method, and adopting the reduced pressure deaerating method, it is low voltage comparatively and preparative pressure arrival is carried out by low temperature and long time amount.
[0029] In this case, if the interlayer in which embossing was formed at the temperature of 90-130 degrees C is used, the glass laminate in which heat deformation of embossing became remarkable, and embossing was crushed good as a whole, and was graduated, consequently deaeration nature and an adhesive property were further excellent will be obtained. Moreover, it turned out that the line speed like preparative pressure commencement of work can also be gathered. In this way, the interlayer for glass laminates of this invention (invention of claim 3) is obtained.
[0030] In order to manufacture a glass laminate using the interlayer of this invention, the process of the usual glass laminate is adopted. For example, when the interlayer which consists of a plasticization polyvinyl-butyral-resin sheet is used, Between the transparent inorganic glass plates of two sheets, on both sides of an interlayer, consider as a layered product, and this layered product is moved at the rubber back. A rubber bag is connected to an exhaust air system, and it is [about]. -It heats by whenever [open air stoving temperature / of about 70-120 degrees C] to the vacuum (absolute pressure 380 - 10mmHg) of 400 - -750mmHg, carrying out attraction reduced pressure. Temperature Raising, Preparative pressure arrival is performed at about 40-100 degrees C, and it is manufactured by subsequently performing this sticking by

pressure using a press by the temperature of about 120-150 degrees C, and the pressure of about ten to 15 kg/cm2, using an autoclave.
[0031] In addition, as the above-mentioned glass plate, not only an inorganic glass plate but organic glass plates, such as a polycarbonate plate and a polymethylmethacrylate plate, can be used. Moreover, the laminating configuration of a glass laminate can be considered as a multilayer configuration not only like 3 lamination of a glass plate / interlayer / glass plate but a glass plate / interlayer / glass plate / interlayer / glass plate.
[0032]
[Embodiment of the Invention] Hereafter, the example and the example of a comparison of this invention are shown.
In the example 1 polyvinyl-butyral-resin (whenever [of residual acetyl groups / average-degree-of-polymerization 1700 and one mol % and butyral-ized] 65-mol %) 100 weight section, the magnesium acetate 0.2 weight section was mixed with the triethylene-glycol-di-2-ethyl-butyrate 40 weight section as an adhesive strength regulator as a plasticizer, melting kneading of this mixture was carried out at 210 degrees C with the extruder, from extrusion metal mold, it extruded in the shape of a sheet at 210 degrees C, and accommodation maintenance of the temperature of a sheet was carried out through ten temperature control rollers at 70 degrees C.
[0033] Then, by passing the gap of the embossing roller (roller temperature of 90 degrees C) of a vertical couple with which the concave (for a protruding line imprint) which followed the front face by much parallel was formed in 70 degrees C in the above-mentioned sheet by which accommodation maintenance was carried out Embossing which consists of many parallel protruding lines was formed in both sides of a sheet, ten guide rollers which had this embossed sheet cooled were passed, it cooled at 15 degrees C, the taking over roll of a couple took over, and the interlayer with a thickness of 0.76mm was manufactured. The water content of this interlayer was adjusted to 0.4 - 0.5% of the weight.
[0034] As embossing of the above-mentioned interlayer shown to drawing 1 (A) in a perspective view, each protruding line (height of 50 micrometers and 200 micrometers of bases) 11,110 and cross-section configuration of the shape of a triangle in which the cross-section configuration sharpened in the head were arranged so that it might consist of each V-like concave (a depth of 50 micrometers, and flute width of 200 micrometers) 12,120 and each protruding line 11 of one field and each protruding line 110 of the field of another side might go direct mutually. In addition, 10 shows an interlayer.
[0035] Each concave which continued by much parallel of the embossing roller front face of an example 2 vertical couple was changed into the discontinuous concave (for a protruding line imprint) by much parallel, and accommodation maintenance of the sheet temperature just before passing the embossing roller of a vertical couple further was carried out at 90 degrees C. Except it, it carried out like the example 1 and the interlayer with a thickness of 0.76mm was manufactured.
[0036] Each protruding line 21,210 of the shape of a triangle in which the cross-section configuration sharpened in the head as embossing of the above-mentioned interlayer shown to drawing 1 (B) in a perspective view (height of 50 micrometers, the base of 200 micrometers, and die length of 220 micrometers), The cross-section configuration consisted of a V-like concave (a depth of 50 micrometers, and flute width of 200 micrometers) 22,220, the groove gap 23,230 was further formed between each protruding line, and each protruding line 21 of one field and each protruding line 210 of the field of another side were arranged so that it might go direct mutually. In addition, 20 shows an interlayer.
[0037] Accommodation maintenance of the sheet temperature just before passing the embossing roller of an example 3 vertical couple was carried out at 110 degrees C. Except it, it carried out like the example 1 and the interlayer with a thickness of 0.76mm was manufactured.
[0038] Embossing of the above-mentioned interlayer was the same as that of drawing 1 (A), the cross-section configuration became each protruding line (height of 50 micrometers, and 200 micrometers of bases) of the shape of a triangle in which the cross-section configuration sharpened in the head from each V-like concave (a depth of 50 micrometers, and flute width of 200 micrometers), and each protruding line of one field and each protruding line of the field of

another side were arranged so that it might go direct mutually.
[0039] Accommodation maintenance of the sheet temperature just before passing the embossing roller of a vertical couple further was carried out at 110 degrees C using the embossing roller of a vertical couple with which the irregular concavo-convex pattern (for a crest type imprint) was formed in example of comparison 1 front face. Except it, it carried out like the example 1 and the interlayer with a thickness of 0.76mm was manufactured.
[0040] the irregular concavo-convex pattern from which the concavo-convex pattern of embossing of the above-mentioned interlayer consists of a crevice of a large number to the detailed crest type (wave type) projection which a large number became independent of, and a projection of this etc., and the height and the depth of a projection differ, respectively -- it is -- the surface roughness (ten-point average of roughness height) -- 30 micrometers it was .
[0041] Accommodation maintenance of the sheet temperature just before passing the embossing roller of a vertical couple further was carried out at 110 degrees C using the embossing roller of a vertical couple with which the regular concavo-convex pattern (for a rectangular-head cone imprint) was formed in example of comparison 2 front face. Except it, it carried out like the example 1 and the interlayer with a thickness of 0.76mm was manufactured.
[0042] from the crevice of a large number to the projection of a detailed rectangular-head cone which, as for the concavo-convex pattern of embossing of the above-mentioned interlayer, a large number became independent of, and a projection of this etc. -- becoming -- a concavo-convex pattern regular respectively similarly [the height and the depth of a projection] -- it is -- the surface roughness (ten-point average of roughness height) -- 49 micrometers it was .
Accommodation maintenance of the sheet temperature just before passing the embossing roller of a vertical couple further was carried out at 110 degrees C using the embossing roller of a vertical couple with which the concave (for a protruding line imprint) which continued by much parallel was formed in example of comparison 3 front face. Except it, it carried out like the example 1 and the interlayer with a thickness of 0.76mm was manufactured.
[0043] The cross-section configuration became each protruding line (height of 50 micrometers, and 200 micrometers of bases) of the shape of a triangle in which the cross-section configuration sharpened in the head from each V-like concave (a depth of 50 micrometers, and flute width of 200 micrometers), and each protruding line of one field and each protruding line of the field of another side were mutually arranged for embossing of the above-mentioned interlayer by parallel.
[0044] It carried out like the example 1 except having changed the roller temperature of the embossing roller of an example 4 vertical couple into 95 degrees C. In this case, when the sheet skin temperature (embossing temperature) immediately after passing an embossing roller was measured with the non-contact type temperature measurement plan, that temperature was 90 degrees C.
[0045] It carried out like the example 2 except having changed the roller temperature of the embossing roller of an example 5 vertical couple into 110 degrees C. In this case, when the sheet skin temperature (embossing temperature) immediately after passing an embossing roller was measured with the non-contact type temperature measurement plan, that temperature was 105 degrees C.
[0046] It carried out like the example 3 except having changed the roller temperature of the embossing roller of an example 6 vertical couple into 135 degrees C. In this case, when the sheet skin temperature (embossing temperature) immediately after passing an embossing roller was measured with the non-contact type temperature measurement plan, that temperature was 130 degrees C.
[0047] It carried out like the example 1 of a comparison except having changed the roller temperature of the embossing roller of an example of comparison 4 vertical couple into 150 degrees C. In this case, when the sheet skin temperature (embossing temperature) immediately after passing an embossing roller was measured with the non-contact type temperature measurement plan, that temperature was 145 degrees C.
[0048] It carried out like the example 3 of a comparison except having changed the roller temperature of the embossing roller of an example of comparison 5 vertical couple into 150

degrees C. In this case, when the sheet skin temperature (embossing temperature) immediately after passing an embossing roller was measured with the non-contact type temperature measurement plan, that temperature was 147 degrees C.
[0049] The surface roughness Rz1 of embossing by the following approach [interlayer / which was obtained in each above-mentioned example and each example of a comparison], Rz2, and Rz3 It measured. Moreover, about this interlayer, the blocking test was performed by the following approach and the autohesion nature and the handling workability of an interlayer were evaluated. Furthermore, about the glass laminate using this interlayer, the BEKU test was performed by the following approach and the deaeration nature like preparative pressure commencement of work was evaluated. The result is collectively shown in a table 1 and a table 2.
[0050] A <measurement of surface roughness> interlayer is set to 20-degree-C **2-degree C thermostatic chamber, and it is JIS. B Based on 0601, the ten-point average of roughness height is measured, and it is the value Rz1 It carried out. Moreover, after carrying the above-mentioned interlayer on a release paper and leaving it for 10 minutes in 40-degree C oven, it cools at 20 degrees C and the ten-point average of roughness height is measured about this interlayer in 20-degree-C **2-degree C thermostatic chamber, and it is that value Rz2 It carried out. Furthermore, after carrying the above-mentioned interlayer on a release paper and leaving it for 10 minutes in 80-degree C oven, it cools at 20 degrees C and the ten-point average of roughness height is measured about this interlayer in 20-degree-C **2-degree C thermostatic chamber, and it is that value Rz3 It carried out.
[0051] In addition, criteria die length of a probe-type surface roughness meter is 8mm using the Kosaka Laboratory surfboard coder SE-40D mold.
[0052] The <blocking test> interlayer was judged to 15cmx15cm, after carrying the weight of 13 kg two-sheet superposition and on it and leaving this at a room temperature for 24 hours, the tension tester performed the friction test 180 degrees the rate for 500mm/(five repeats), and this exfoliation force (g/15cm width of face) was measured. Blocking resistance and handling workability are excellent, so that this exfoliation force is small. Practically, this exfoliation force is below 500g/15cm width of face, and it is supposed that the handling workability at the time of pinching an interlayer between the blocking resistance at the time of letting out under storage and from a volume serious condition or a glass plate is enough.
[0053] A <BEKU test> interlayer is pinched between two transparent float glass plates (3mm in 30cm[30cm by] x thickness). Cut off the overflowing part and the layered product obtained in this way is moved in a rubber bag. It heats so that the temperature (just before [preparative pressure arrival] temperature) of a layered product may become 25 degrees C, 35 degrees C, and 50 degrees C, respectively. While connecting the rubber bag to the attraction reduced pressure system after that and heating by whenever [open air stoving temperature / of 120 degrees C], after holding for 15 minutes to the vacuum of -500mmHg (absolute-pressure 260mmHg), it returned to atmospheric pressure and preparative pressure arrival was ended. In this case, the temperature of the interlayer at the time of preparative pressure arrival was 45 degrees C, 65 degrees C, and 85 degrees C, respectively.
[0054] Then, it is the layered product which carried out preparative pressure arrival within an autoclave The temperature of 130 degrees C, and pressure 13 kg/cm2 After holding for 10 minutes under a condition, temperature was returned to lowering atmospheric pressure to 50 degrees C, and this sticking by pressure was ended. In this way, the obtained glass laminate was heated in 150-degree C oven for 2 hours, and it took from oven, and cooled for 3 hours, the number of sheets which foaming (air bubbles) produced in the glass laminate was investigated, and deaeration nature was evaluated. Trial number of sheets could be 100 sheets. Deaeration nature is excellent, so that there is little number of sheets which foaming produced. Practically, the number of sheets which foaming produced in 100 sheets is 0-1 or less sheet, and deaeration nature is made enough.
[0055]
[A table 1]

	実施例1	実施例2	実施例3	比較例1	比較例2	比較例3
凸状の形状配置 高さ（μm） 底辺（μm） 間隔（μm） 長さ（μm）	三角連続規則的 千鳥配置交 50 200 200 連続	三角不連続規則的 千鳥配置交 50 100 200 220	三角連続規則的 千鳥配置交 50 100 200 連続	山型凸起不規則 配置同じ （表面粗さで30μm）	四角錐体規則的 配置同じ （表面粗さで50μm）	三角連続規則的 千鳥配置平行 50 200 200 連続
中間膜の表面粗さ（十点平均粗さ）（μm） Rz1 Rz2 Rz3 0.8 Rz1	50 46 23 40	60 43 20 48	50 49 49 40	30 28 28 24	49 49 50 39	51 50 51 41
中間膜のブロッキングテスト（剥離力）（kg/15cm幅）	212	150	212	201	1050	2550
予備圧着直前温度（℃）	25 35 50	25 35 50	25 35 50	25 35 50	25 35 50	25 35 50
合わせガラスのベークテスト（発泡枚数）（枚／100 枚）	0 0 0	0 0 0	1 1 2	2 4 5	2 3 6	1 3 5

[0056]
[A table 2]

	実施例4	実施例5	実施例6	比較例4	比較例5
エンボス温度（℃）	90	105	130	145	147
凸状の形状配置 高さ（μm） 底辺（μm） 間隔（μm） 長さ（μm）	三角連続規則的 千鳥配置交 40 200 200 連続	三角不連続規則的 千鳥配置交 40 100 200 220	三角連続規則的 千鳥配置交 35 100 200 連続	山型凸起不規則 配置同じ （表面粗さで30μm）	三角連続規則的 千鳥配置平行 45 200 200 連続
中間膜の表面粗さ（十点平均粗さ）（μm） Rz1 Rz2 Rz3 0.8 Rz1	48 32 22 38	52 39 31 42	45 36 32 38	30 28 28 24	50 48 50 40
中間膜のブロッキングテスト（剥離力）（kg/15cm幅）	215	148	196	202	2650
予備圧着前温度 下値圧着時の温度	25 35 50 45 65 85	25 35 50 45 65 85	25 35 50 45 65 85	25 35 50 45 65 85	25 35 50 45 65 85
合わせガラスのベークテスト（発泡枚数）（枚／100 枚）	0 0 0	0 0 0	0 0 0	2 3 5	4 4 4

[0057]
[Effect of the Invention] Embossing which consists of many parallel protruding lines is formed in both sides of a thermoplastics sheet as above-mentioned. It is arranged so that each protruding line of one field and each protruding line of the field of another side may cross mutually. And while the die length of each protruding line is set up for a long time than the flute width of the concave to each protruding line and excelling in the handling workability at the time of pinching an interlayer between the blocking resistance at the time of this letting out under storage and from a volume serious condition, and a glass plate The interlayer for glass laminates excellent in the deaeration nature like preparative pressure commencement of work can be obtained.

[0058] By setting the surface roughness (Rz) of embossing of at least one side as specific range (Rz2 >0.8Rz1'>=Rz3) which was explained in the text especially While excelling in the handling workability at the time of pinching an interlayer between the blocking resistance at the time of letting out under storage and from a volume serious condition, and a glass plate, the deaeration nature like preparative pressure commencement of work can obtain the further excellent interlayer for glass laminates. Moreover, there is an advantage that preparative pressure arrival is made at comparatively low temperature.
[0059] Furthermore, by using the interlayer in which embossing was formed at the temperature of 90-130 degrees C, heat deformation of embossing like preparative pressure commencement of work becomes remarkable, as a whole, embossing is crushed good, and is graduated, and the glass laminate in which deaeration nature and an adhesive property were further excellent is obtained. Moreover, there is an advantage that the line speed like preparative pressure commencement of work can also be gathered.
[0060] Therefore, if a glass laminate is manufactured using the interlayer of this invention Even if it is the case where the productivity (especially line speed like preparative pressure commencement of work) of the case where a glass laminate especially with a large area and a glass laminate with large curvature are manufactured, or a glass laminate is raised Deaeration is fully performed, the layer of an interlayer is graduated good along the field of a glass plate, especially transparency is excellent, and the good glass laminate of quality can be manufactured.

[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] the part which shows the interlayer from which (A) was obtained in the example 1 of this invention -- a notching perspective view and (B) show the interlayer obtained in the example 2 of this invention -- it is a notching perspective view a part.
[Description of Notations]
10 20 Interlayer
11, 110, 21,210 Triangle-like protruding line
12, 120, 22,220 V-like concave
23,230 Groove gap

[Translation done.]